Paradise Creek

Paradise Creek Riparian Restoration

A PROGRAM OF THE PALOUSE-CLEARWATER ENVIRONMENTAL INSTITUTE

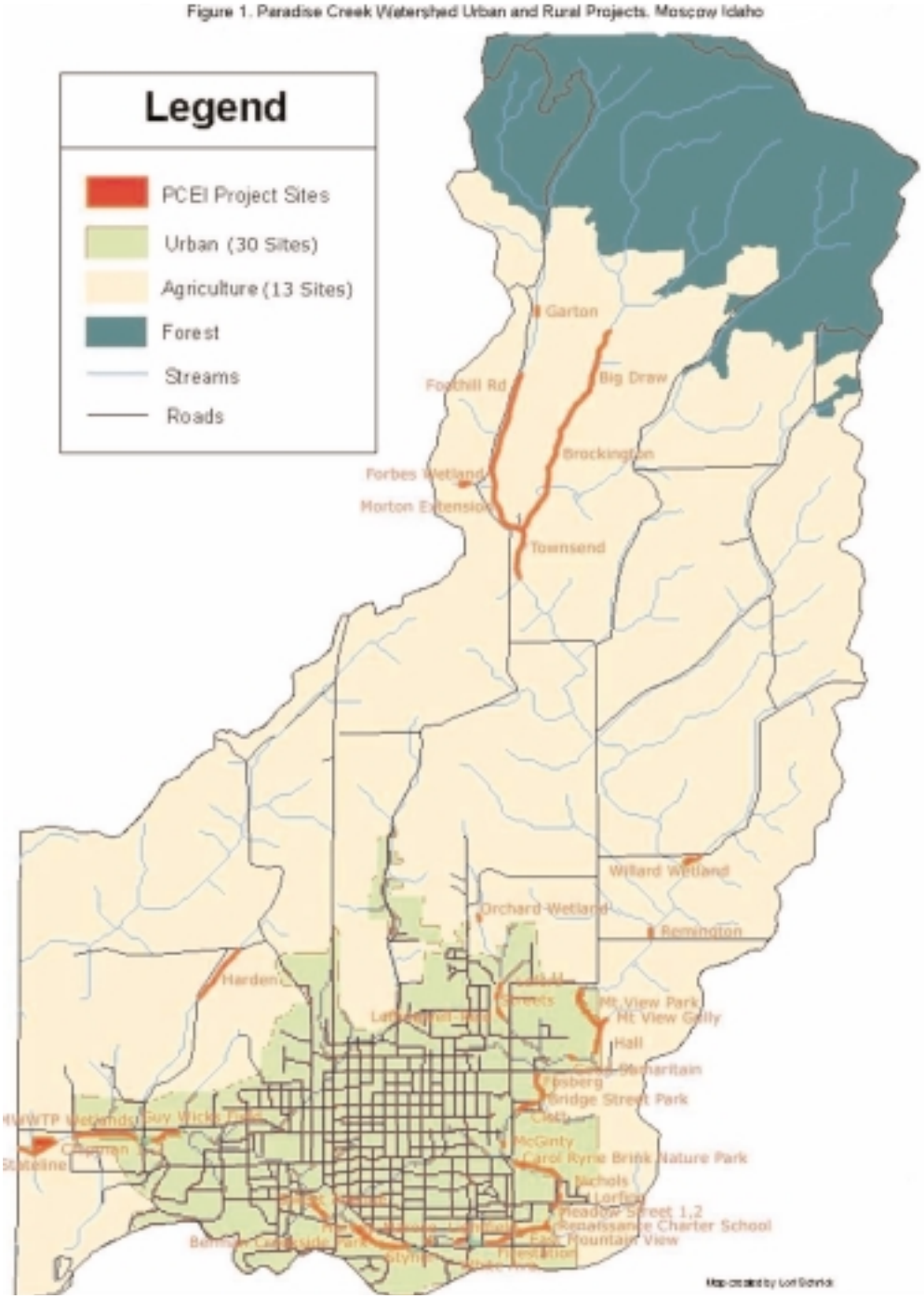
There are thirty-four sub-projects funded through NPS 319 subgrants that have been completed under the Paradise Creek Riparian Restoration Program by the Palouse-Clearwater Environmental Institute since 1999. All of the sub-projects are located in the Paradise Creek watershed upstream of the City of Moscow (Figure 1). Partners and local matching funds came from a wide variety of sources. The *Urban Riparian Restoration Project* began in 1999 and continues to date. This summary contains pertinent information, including photographs for four of the twenty- three urban sub-projects for 2003:

- Leffingwell-Reid Wetland Construction and Revegetation
- Lefors Wetland: Wetland Construction and Riparian Planting
- Streets Wetland Construction and Riparian Planting
- White Avenue: Stream bank Stabilization and Revegetation

The *Rural Riparian Restoration Project* began in 1999 and continues to date. This summary contains pertinent information including photographs for ten of the eleven rural sub-projects for 2003:

- Brockington Riparian Planting
- Forbes Wetland Construction and Riparian Planting
- Garton Hardened Rock Stream Crossing
- Harden Riparian Planting
- Morton Meander, Floodplain, Wetland Construction, and Riparian Planting
- Morton Extension Channel Remeander and Riparian Planting
- Remington Riparian Planting
- Townsend Re-meander, Floodplain Excavation, and Riparian Planting
- Willard Sediment Catchment, Wetland and Riparian Planting
- Big Draw Riparian planting

FIGURE 1
Paradise Creek Watershed Urban and Rural Projects, Moscow, Idaho



LEFFINGWELL-REID WETLAND CONSTRUCTION AND REVEGETATION

Partners and local matching funds came from Jeanne Leffingwell, James Reid, the City of Moscow, and community volunteers. The project took place during Summer 2003 and included 650 feet of stream bank restoration and construction of 8,420 square feet of wetlands in three areas.

PREVIOUS CONDITIONS: Prior to restoration, this Paradise Creek tributary was a straight, incised channel. Reed canary grass was the predominant species, with a vigorous infestation of Canada thistle and morning glory. The site had few native trees and shrubs, grasses and forbs. The stream reach was exposed to direct solar radiation as well as storm water runoff containing sediments, nutrients, and pesticides.

DESCRIPTION OF COMPLETED ACTIVITY: This urban riparian restoration project is a demonstration of the effectiveness of creating and maintaining a riparian wetland area in the Paradise Creek watershed. The long-term goals of the project include establishment of native riparian vegetation, improved water quality, and increased habitat for wildlife.

To accomplish these goals, a narrow meandering stream channel and three associated wetlands were constructed. Wetlands vary in depth from 1 to 2.5 feet. Professional Operators Company excavated the site with a track hoe, using an 18-inch toothed bucket. The construction phase took approximately three days to complete. The wetlands are adjacent to the new channel to receive and filter runoff before entering the stream and to increase flood storage capacity (Figure 2).

Community volunteers helped seed the site with native grasses and install geotextile fabric on newly constructed banks. Wetland transplants and herbaceous plugs were planted along the stream channel, as well as in and around the three wetlands. Stream banks and wetland edges

FIGURE 2 *Leffingwell-Reid property after work was complete in Fall 2003*

were seeded with native grasses, including tufted hairgrass, ticklegrass, fowl bluegrass, western managrass, prairie junegrass, and Idaho fescue. The riparian area was also planted with herbaceous species (small-fruited bulrush, common rush, creeping spikerush) and native woody species (red osier dogwood, sandbar and Mackenzie willow [plugs], quaking aspen, Douglas hawthorn, Nootka rose, serviceberry, shiny leaf spirea, and syringa).

LIGHTFIELD STREAM BANK STABILIZATION AND RIPARIAN PLANTING

Partners and local matching funds came from Kirk Lightfield, the City of Moscow, and community volunteers. The project was constructed during Summer 2003, along a stretch of Paradise Creek located between Blaine Street and Lynn Street, 918 White Avenue, Moscow, and consists of 200 feet of stream bank restoration.

PREVIOUS CONDITIONS: The stream segment had nearly vertical, slumping, eroding stream banks that contribute to the sediment load in the creek. Reed canary grass was the predominant species on this stream reach. There was a lack of existing native woody vegetation close to the creek to help shade out weeds and decrease water temperature. In the past, this reach of Paradise Creek was dredged, which exacerbated the steep banks and promoted incising (Figure 3).

DESCRIPTION OF COMPLETED ACTIVITY: The construction phase of the project was completed September 23, 2003. Moscow contractor, Dale Stubbs, excavated the existing bank to create a 2:1 slope. Slope construction took approximately six hours using a 48-inch toothed bucket. Bio-logs were installed at the toe of slope to provide a shelf for plant material and bank stabilization. The coir logs were terraced two high on the upstream section of the project, this technique used to minimize undercutting in an area of high velocity. The re-sloped bank was promptly seeded with native grasses (tufted hairgrass, ticklegrass, fowl bluegrass, western managrass, prairie junegrass, and Idaho fescue), herbaceous plants (small-fruited bulrush, common rush, creeping spikerush) and native woody species (red-osier dogwood, sandbar and Mackenzie willow [plugs], quaking aspen, Douglas hawthorn, Nootka rose, serviceberry, shiny leaf spirea, and syringa) (Figure 4).

FIGURE 3 *Lightfield Stream bank before work*

FIGURE 4 *Lightfield Stream bank after work*

STREETS: WETLAND CONSTRUCTION AND RIPARIAN PLANTING

Partners and local matching funds came from AmeriCorps*NCCC, TerraGraphics Environmental Engineers, Renaissance Charter School, Lapwai Elementary School, and community volunteers. During Fall 2002 and Spring 2003, restoration of two wetlands, covering 14,019 square feet and 732 feet of stream bank, was completed in a draw between Mountain View Road and Cleveland Street. This location is behind a residence in Moscow.

PREVIOUS CONDITIONS: The site is on a tributary to Paradise Creek in a draw. The stream segment was bordered by a steep bank on the east side and a wide, flat wet area to the west. The site was inundated for a significant portion of the year, which made it a suitable location for a wetland. Reed canary grass was the dominant vegetation along the stream segment, and few trees or other woody species were present. The site was directly downstream from a horse pasture and was impacted by associated pollutants entering the water from upstream.

DESCRIPTION OF COMPLETED ACTIVITY: Two shallow, excavated wetlands were constructed at the site. The wetlands range from 40 to 80 feet wide, are approximately 275 ft long, and have an organic shape. The depth of the wetlands ranges from 1 to 2.5 ft. The wetland area is fed by runoff and a spring located in the northern portion of the project. In addition to the spring, the wetland design allows the waters of the adjacent stream to spill out, over into the wetland area while providing a defined channel for water movement in low flow situations. A berm, located on the east side of the stream, was removed to allow for the extension of the floodplain. Approximately 895 cubic yards of soil was excavated from this site. The excavated soil was relocated onsite.

Wetlands were constructed on the tributary to Paradise Creek to improve flood control, provide native habitat for wildlife, and filter pollutants. The constructed wetland also provides recreational and educational opportunities for the community. Native species of woody shrubs, trees and grasses were planted along the bank to provide shade to the stream and wetlands and wildlife habitat. Herbaceous wetland plants were planted in the wetland to help improve water quality by reducing nutrient loading through filtering. All plantings are protected from animal damage with plastic tubes.

Native willow and cottonwood cuttings were planted along the banks of the stream to secure the banks and introduce shade to the system, creating a woody riparian buffer. Woody riparian buffers offer many benefits, including filtration of runoff, wildlife habitat and flood water retention. PCEI also organized a day of camas planting with students from Renaissance Charter School and Lapwai Elementary School. The students learned about the ecological and cultural significance of the camas from a member of the Nez Perce Tribe and helped restore the plant to its native Palouse Prairie (Figure 5 and Figure 6).

FIGURE 5 *Streets site before planting*

FIGURE 6 *Streets site after planting*

WHITE AVENUE: STREAM BANK STABILIZATION AND REVEGETATION

Project Partners and local matching funds came from the City of Moscow, AmeriCorps*NCCC, University of Idaho students, and community volunteers. The project, completed along a stretch of Paradise Creek between the Latah County Fairgrounds and Blaine Street in Moscow, took place during September 2002 and Spring 2003 and includes 358 feet of stream bank restoration.

PREVIOUS CONDITIONS: The stream segment had near vertical, slumping, eroding stream banks with little vegetation that contributed to the sediment load in the creek. Paradise Creek had been dredged in this reach many different times, which added to its degraded state. In the past, the City of Moscow dumped asphalt onto the sides of the bank in an effort to stabilize the side.

DESCRIPTION OF COMPLETED ACTIVITY: The purpose of this project was to reslope the stream bank to a 2:1 or 3:1 slope from its near-vertical state reduce erosion, and allow for the establishment of woody vegetation. The project site is 358 linear feet of a heavily damaged, ditch-like creek. The stream bank is composed almost entirely of fill, especially gravel and concrete chunks. After removal of the debris, the site was hydroseeded with a native seed mix and then covered with erosion control fabric. Snowberry and Wood's rose were planted on the site. A few sedges and rushes were planted at the toe of the slope (Figure 7).

FIGURE 7 *Moscow wastewater treatment wetlands planting*

BROCKINGTON RIPARIAN PLANTING

Partners and local matching funds for this project came from Judy Brockington, Steve and Laura Nidlow, Larry McMillan, Clint Townsend, University of Idaho students, Girl Scout troops, AmeriCorps *NCCC, Washington State University students, the University of Idaho Community Service Learning Center, University of Idaho Environmental Club, Church of Latter Day Saints, National Tree Trust, Russell Elementary School, and Boy Scout troops. Project installation, located approximately 3.5 miles north of Moscow, Idaho, occurred from April 2003 through October 2003.

PREVIOUS CONDITIONS: Reed canary grass lined the banks of the two Paradise Creek tributaries flowing through the Brockington property. Active wheat fields were directly adjacent to the stream. A riparian buffer was absent in this section of the creek, which exposed the creek to direct solar radiation as well as runoff containing sediments, nutrients, and pesticides. There were multiple equipment crossings through the eastern tributary.

DESCRIPTION OF COMPLETED ACTIVITY: The scope of this project was to plant a variable width buffer along the two tributaries on this property, including a total length of 2,500 feet. The riparian buffer ranges from 10 to 40 feet in width and consists of native shrubs and trees. The buffer area of the eastern tributary was also seeded with native grass seed. PCEI completed minimal excavation along the eastern tributary to create a narrow, low flow channel with associated floodplain, in conjunction with the adjacent Townsend project. In addition to the excavation coordinated by PCEI (the current agricultural operator), Larry McMillan contributed by excavating the sediment-laden channels of both tributaries. McMillan's work included excavating to the level of the culvert below the Brockington driveway. The Brockington project borders the Big Draw project to the north and the Townsend project to the east and south, therefore it is expected to have significant benefit as a wildlife corridor as vegetation matures (Figure 8 and Figure 9).

FIGURE 8 *Brockington Riparian Area prior to planting woody vegetation*

FIGURE 9 *Brockington Riparian Area immediately after woody vegetation was planted. Farm equipment will be restricted to designated waterway crossings. Plastic collars protect young plants from deer and elk until plants become established.*

FORBES WETLAND CONSTRUCTION AND RIPARIAN PLANTING

Partners and local matching funds for this project came from Washington State University environmental science students, the University of Idaho Community Service Learning Center, Lapwai Elementary School Students, Nez Perce Tribe, and community volunteers. The project, located north of Moscow, Idaho near Moscow Mountain, included work along 820 feet of stream channel and installation of three wetlands for a total of 12,800 square feet. Wetland excavation occurred on July 25, 2003. Plantings were completed in September and October of 2003.

PREVIOUS CONDITIONS: This seasonally wet draw with intermittent springs collects a significant amount of water from the surrounding hills and is a tributary to Paradise Creek in the spring. In the past, this draw has been utilized as horse pasture. The Forbes family recently purchased the property and decided to enhance its value as native habitat and improve its water quality. Prior to restoration, reed canary grass, meadow foxtail, morning glory, and other invasive weeds dominated ground cover. There was little vegetative diversity at this site.

DESCRIPTION OF COMPLETED WORK: The scope of work for this site was to construct several wetland benches. The goals of the project were to increase the flood storage capacity of the draw, provide a place for sediment to settle, increase biological diversity with native species, improve water quality of this small tributary, and establish a shallow channel to allow wetlands overflow to flow into Paradise Creek.

All exposed soil was seeded and mulched after construction. Species used were fowl bluegrass, tufted hairgrass, ticklegrass, prairie junegrass, and yarrow. Native woody and herbaceous

vegetation was planted in the fall of 2003. Herbaceous plants will continue to be planted over the next few years as the storage capacity and other characteristics of the wetlands become more apparent. PCEI organized a planting of 150 camas bulbs in October of 2003 with students from Lapwai Elementary School. The students learned about the cultural and ecological significance of camas in addition to helping restore the species (Figure 10 and Figure 11).

FIGURE 10 *Forbes area in Spring 2003, prior to wetland construction and riparian planting*

FIGURE 11 *Photo 4. Forbes area after Fall 2003, including wetlands and woody riparian plants*

GARTON HARDENED ROCK STREAM CROSSING

Partners and local matching funds for this project came from Oz and Virginia Garton, Latah County Youth Services, and community volunteers. Project installation occurred on August 21, 2003.

PREVIOUS CONDITIONS: This section of Paradise Creek, located three miles north of Moscow, has populations of quaking aspen, Douglas hawthorn, snowberry, serviceberry, cow parsnip, and many other species that compose a healthy riparian buffer. Restoration effort targeted a specific problem area disturbed by an established horse crossing that provided access to pasture on both sides of the creek. Prior to restoration, continuous use of the stream section for animal passage contributed to nutrient and sediment inputs. The presence of large stands of Canada thistle in proximity to the creek was also of concern.

DESCRIPTION OF COMPLETED ACTIVITY: The project was designed to minimize disturbance to the riparian area and to improve water quality along this reach of Paradise Creek. The long-term goals of this project include the following:

Improved water quality though construction of a hardened rock crossing that limits creek disturbance while still providing access to pasture.

FIGURE 12 *Garton Stream before the work*

Minimized erosion from animal impact by concentrating the animal traffic to an area properly constructed to withstand animal use.

Mark Hawley of Moscow was hired to do shallow excavation and to place the rock fill. Rock, eight inches or less in diameter, was used to fill the depression, and a two foot strip of gravel dressing was placed down the middle of the crossing to lessen the possibility of injury to the animals. Filter fabric was installed beneath the rock. Project construction lasted about five hours. Figure 12 and Error! Reference source not found. show the crossing before and after the work was accomplished.

FIGURE 14 *Garton Stream After the work*

HARDEN RIPARIAN PLANTING

Partners and local matching funds came from a Washington State University environmental science class, AmeriCorps*NCCC, and community volunteers.

This project, installed on March 29, 2003, includes 1,720 feet of stream bank restoration.

PREVIOUS CONDITIONS: Prior to restoration, the channel of this tributary to Paradise Creek had been straightened to allow for cultivation to the stream's edge. Reed canary grass lined the banks of the creek, and active wheat fields were directly adjacent to the stream on the east side (Figure 15). A riparian buffer was absent in this section of the creek, which exposed the creek to direct solar radiation as well as agricultural runoff containing sediments, nutrients, and pesticides.

DESCRIPTION OF COMPLETED ACTIVITY: The purpose of this project was to create a riparian buffer along an 860-foot reach of a tributary to Paradise Creek, so 563 trees and shrubs were installed along the stream channel. Woody riparian buffers offer many benefits, including filtration of

runoff, soil stabilization, wildlife habitat, and floodwater retention. These plantings will be protected from vole damage with plastic tubes. The plants in Figure 16 were watered and weeded on multiple occasions in 2003.

FIGURE 15 *Harden Riparian Area prior to work*

FIGURE 16 *Harden Riparian Area after work completed*

MORTON MEANDER, FLOODPLAIN, WETLAND CONSTRUCTION, AND RIPARIAN PLANTING

Partners and local matching funds came from the Latah Soil & Water Conservation District, Natural Resource Conservation Service, Idaho Soil and Water Conservation Commission, BonTerra, Wildlife Habitat Institute, Church of Latter Day Saints members, AmeriCorps*NCCC, National Tree Trust, University of Idaho and Washington State University classes and students, Ron Morton, Moscow High School students, and community volunteers.

This project located near Moscow Mountain, on Foothill Road north of Moscow, includes 7,200 feet of stream bank restoration and two wetlands covering 115,650 square feet.

PREVIOUS CONDITIONS: Prior to restoration, the stream channel was straightened and acted as a drainage ditch along Foothill Road. Reed canary grass lined the banks of the creek, and active wheat fields were directly adjacent to the stream. A riparian buffer was absent in this section of the creek, which exposed the creek to direct solar radiation as well as storm water runoff containing sediments, nutrients, and pesticides.

DESCRIPTION OF COMPLETED ACTIVITY: This rural riparian restoration project will demonstrate the effectiveness of maintaining a riparian buffer strip along agricultural stream channels. The primary long-term benefits from this project will include the following:

- Establishing native riparian vegetation along the creek to provide habitat for fish and aquatic invertebrates, a corridor for migratory wildlife, and habitat for resident wildlife
- Improving water quality due to riparian vegetation shading and filtration and trapping of sediments, nutrients, and organic matter from runoff before it reaches the creek
- Restoring hydrological diversity within the creek through installation of meanders that resemble the creek's historical path

To accomplish these ends, riparian floodplain, meandering stream channel, and associated wetlands were constructed and vegetated with native woody vegetation, grasses, and emergent herbaceous wetland plants.

TerraGraphics Environmental Engineering, Inc designed the re-constructed stream channel and wetlands. The main channel cross section was designed to accommodate the calculated 2-year, 24-hour flow of 25 cubic feet per second (cfs). The floodway of the new channel was designed to accommodate up to 147 cfs, the elevation of a localized 100-year flood event. Two wetlands approximately 12 inches deep were excavated adjacent to the newly meandered stream to receive runoff before it enters the stream, to act as a flood storage and groundwater recharge area, and to provide habitat for wildlife.

Stream channel meanders were constructed during low stream flows (mid July – early August) to minimize erosion resulting from construction. The stream was relocated to follow its estimated historical path approximately 200 feet east of its prior location, and the meanders were installed to follow the natural contours of the land, determined by a survey of topographical features, old aerial photographs, and clues from the current natural runoff flow.

Volunteers from the Church of Latter Day Saints and other community volunteers helped stabilize the newly constructed stream banks with geotextile fabric and coir logs. The entire stream channel was lined with coconut fiber BioLogs® and pre-planted with wetland vegetation. These activities stabilize the toe of the stream banks, maintain the newly constructed meanders, catch sediments from runoff to the creek, and help filter nutrients from the water as it travels downstream.

In the fall of 1999, the stream channel, floodplain and adjacent land were seeded, by hand and with farm equipment, with a riparian grass mix. The following spring, PCEI volunteers and the Mortons planted a 150 foot wide buffer strip with a mix of native woody plant species. The first 30 feet on either side of the creek was planted by PCEI; the remaining 120 feet was planted by a private company contracted by the landowners, with assistance from the continuous riparian buffer strip Conservation Reserve Program, to form a 150 foot buffer strip on each side. The two wetlands were seeded with locally collected wetland plant seeds.

The stream banks were planted with red-osier dogwood (*Cornus sericea*) and willow spp. (eg. *Salix exigua*). Adjacent to the stream channel, and up to 30 feet from the channel, the following species were planted: water birch (*Betula occidentalis*), aspen (*Populus tremuloides*), rocky mountain maple (*Acer glabrum*), black cottonwood (*Populus trichocarpa*), mountain ash (*Sorbus scopulina*), Douglas hawthorn (*Crataegus douglasii*), chokecherry (*Prunus virginiana*), serviceberry (*Amelanchier alnifolia*), and blue elderberry (*Sambucus cerulea*). Herbaceous cover was established by fall to provide ground cover and maintain stream channel integrity during the upcoming winter and spring thaw.

A riparian functioning assessment team organized by the Latah County Soil and Water Conservation District will monitor this site annually to determine the effectiveness of the stream restoration efforts towards improving biological diversity and viability and water quality. Furthermore, the site was marked with a sign and will be accessible to the public, providing a demonstration site to show the benefits of riparian habitat along waterways, demonstrating that such methods can be used to complement current farming practices.

Subsequent work was completed during Spring 2002 and Spring 2003 including 1,790 feet of stream bank restoration. Due to difficult growing conditions, including hard clay soils and vole damage, vegetation failed to establish along some sections of the stream. In the spring of 2002, quaking aspen and red osier dogwood plugs from the National Tree Trust were planted around the wetlands and in other unvegetated areas.

In the spring of 2003, willow and cottonwood poles, and red osier dogwood plugs were planted on the stream banks in spots lacking woody vegetation. Fascines were constructed from live cottonwood and willow cuttings and were placed where banks were bare and sloughing into the creek during high flows. Native wetland plugs, including small-fruited bulrush, Nebraska sedge, and Baltic rush were planted along bare sections of the streams. These deep-rooted plants will hold the stream bank in place and filter sediment and nutrients from the stream. Ponderosa pines from the National Tree Trust were also planted adjacent to the stream to provide long-term shade, contribute woody material to the stream system, and provide wildlife habitat. All work was done with the help of AmeriCorps*NCCC teams (Figure 17 and Figure 18).

FIGURE 17 *Predator bird habitat structure Summer 2003*

FIGURE 18 *Stream bank stabilization being installed Summer 2003*

MORTON EXTENSION CHANNEL RE-MEANDER AND RIPARIAN PLANTING

Project partners and local matching funds came from Ron Morton, University of Idaho (UI) students, UI Circle K, Washington State University (WSU) students, WSU service learning, and community volunteers. During Fall 2003 2,700 feet of stream bank restoration was conducted East of Foothill Road, north of Moscow.

PREVIOUS CONDITIONS: Prior to restoration, the stream channel was nearly straight and was largely overgrown by reed canary grass. There was no native vegetation present other than a few native wetland plants. The reed canary grass monoculture provided little shade to the stream and little wildlife habitat. The lack of woody vegetation and prevalence of fine silt in this section of stream encouraged the development of an excessively wide, shallow channel. In addition, downstream landowners were concerned about flooding resulting from the channel silting in.

DESCRIPTION OF COMPLETED ACTIVITY: A new "E" type stream channel approximately 1' wide and 10" deep was dug with a trackhoe. Channel sinuosity was increased by the inclusion of numerous meanders in the newly constructed channel, doubling the channel length within this reach. An increase in sinuosity will encourage more natural sediment deposition, develop stream-associated wetlands, and reduce stream velocity and thus erosive force.

Native riparian shrubs were planted after channel construction. A riparian buffer of woody vegetation will shade the stream, reduce water temperatures, stabilize soil, filter runoff from adjacent roads and farm fields, and contribute woody material to the stream system (Figure 19 and Figure 20).

FIGURE 19 *Morton extension area prior to work*

FIGURE 20 *Morton extension. Area after work completed*

TOWNSEND REMEANDER, FLOODPLAIN EXCAVATION, AND RIPARIAN PLANTING

Partners and local matching funds came from Clint Townsend, Larry McMillan, a Washington State University science class, University of Idaho students, Cub Scout troops, Girl Scout troops, Washington State University Community Service Learning Center, CAMPOS Student Organization, University of Idaho Community Service Learning Center, University of Idaho Environmental Club, Alternative Breaks Association, University of Idaho Bonner's Scholar Program, Lake City High School faculty, and community volunteers.

Project installation including 3,775 feet of stream bank restoration occurred during Fall 2003.

PREVIOUS CONDITIONS: Due to agricultural development, the stream was braided into several small channels with steep, eroding banks in many places. The site was cultivated to the edge of the stream channel and no riparian vegetation existed. Reed canary grass lined the 40 foot wide braided channel. Our goals were to improve the water quality of the two tributaries that flow through the Townsend property, to increase diversity of native riparian vegetation, and to create habitat for wildlife. Water quality improvements focus on non-point source pollutants like temperature, sediment, nutrients and bacteria. Improvements at this site will contribute to improving water quality in the mainstem of Paradise Creek.

DESCRIPTION OF COMPLETED ACTIVITY: The scope of work included excavating the floodplain, defining a narrow, low flow channel and planting a riparian buffer of woody and herbaceous species. Excavation occurred in September 2003. Excavation was done in two phases. The downstream end, below the confluence of two tributaries was completed first and excavation of the eastern-most tributary was second. The channel was constructed using an excavator and excess soil was spread outside the floodplain on the Townsend property using a bulldozer. A multi-level floodplain was constructed to accommodate varying flow levels. Meanders were

FIGURE 21 *Townsend Waterway prior to reclamation*

FIGURE 22 *Within one year Townsend waterway will have stable banks and support sustainable, healthy riparian vegetation.*

constructed in the new stream channel. A two layered soil wrap revetment was constructed on the downstream end of the project to protect against further erosion of a previously existing scour pool. After construction, all exposed soil was seeded with native grasses and banks were covered with erosion control fabric. In October and November of 2003, a riparian buffer of native trees and shrub, varying in width from 45 to 90 feet, was planted on either side of the stream (Figure 21 and Figure 22).

WILLARD SEDIMENT CATCHMENT, WETLAND AND RIPARIAN PLANTING

Partners and local matching funds came from North Latah Highway District, AmeriCorps*NCCC, community volunteers, Janice Willard, Bill Styer, and Washington State University students. The project was installed on November 7, 2001, with additional planting completed in spring 2003. The project, including 618 feet of stream bank restoration and one wetland covering 10,197 square feet, is located 0.5 mile east of Mountain View Road, between Darby Rd. and Moscow Mountain Rd north of Moscow.

PREVIOUS CONDITIONS: Stream banks along this tributary to Paradise Creek were eroding due to a lack of woody vegetation and steep banks. Reed canary grass formed a dense monoculture, whose shallow root mats did not prevent slumping of the stream bank. Thus, stream banks were frequently undercut during heavy storm events. The lack of trees or woody vegetation along this stream segment allowed direct solar radiation to heat the stream water. There were also high levels of sediments in this tributary that added to the sediment loads of Paradise Creek.

DESCRIPTION OF COMPLETED ACTIVITY: The main purpose of this project was to create a sediment catchment system to trap sediment-filled high water. Another goal was to stabilize and revegetate a 300-foot section of the tributary to provide habitat for wildlife, provide shade to reduce stream temperatures, provide a vegetated buffer from agricultural runoff, and reduce the amounts of sediments entering the stream. Earth moving was completed by Professional Operators Company. PCEI staff and volunteers completed the bank stabilization activities. The catchment banks were sloped to a 3:1 slope. This moderate slope reduces erosion, reconnects the stream to its floodplain, and creates a prime area for native vegetation. The resloped banks were seeded with a riparian grass mixture and covered with geotextile fabric. Native woody vegetation was planted in the spring of 2002. All excavated material was removed off-site. In selected areas (Figure 23), coconut fiber-filled BioLogs®, pre-planted with wetland plants, were installed along the toe of the stream bank for stabilization and to improve water quality through the water-filtering qualities of wetland plants. Woody debris of cedar and pine were installed in the catchment to act as a filter and, in turn, to slow the velocity of the water so sediment could settle out. Planting of native woody and herbaceous vegetation was completed in the spring of 2002 by PCEI staff and volunteers.

FIGURE 23

BIG DRAW RIPARIAN PLANTING

Partners and local matching funds came from the Natural Resource Conservation Service, Idaho Fish and Game, Whitman College Alternative Spring Break, Latah County Youth Services, Delta Chi Fraternity, AmeriCorps*NCCC, National Tree Trust, Church of Latter Day Saints, Latah Trail Foundation, Oz and Virginia Garton, and community volunteers. The project was installed over the spring and fall of 2002 and spring of 2003.

The project, located at Big Draw near Moscow Mountain north of Moscow, includes 5,725 feet of stream bank restoration.

PREVIOUS CONDITIONS: The stream channel had been straightened for agricultural development. The channel was deeply incised in some stretches, and the vegetation was a monoculture of reed canary grass. The steep, bare banks eroded during high water events. The lack of woody native vegetation along the stream channel contributed to bank erosion and high water temperatures for this stretch of the stream.

DESCRIPTION OF COMPLETED ACTIVITY: Thousands of native trees and shrubs, mostly Douglas hawthorn, ponderosa pine, and Nootka rose, were planted along the stream channel to establish a woody riparian buffer. As the vegetation matures, it will shade the stream channel, stabilize eroding banks, and contribute woody material to the stream channel. Woody debris in the channel will increase channel diversity, provide habitat, and help reduce channel incision.